

Higher: Oxidising and Reducing Agents

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Redox reaction:

1. Oxidation of sodium

Reduction of chlorine

Overall redox

2. Oxidation of silver

Reduction of bromine

Overall redox

?

Write the ion electron equations for the oxidation of aluminium, reduction of sulfur and the overall redox equation

Sometimes ion-electron equations are more complex. There are a series of steps to ensure they are balanced correctly.
E.g.

Sulfate to sulfite

1. Balance the main element
2. Add water to balance oxygen atoms
3. Add hydrogen ions to balance hydrogen atoms
4. Add electrons (to same side as H^+) to balance the charge

?

1. Balance these ion-electron equations
2. Identify if they are oxidation or reduction



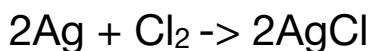
Electrochemical series

Oxidising agent:

Reducing agent:

Identifying oxidising and reducing agents from equations

E.g.



1. Rewrite as an ionic equation and eliminate any spectator ions

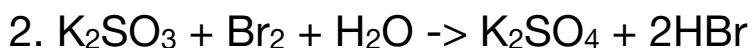
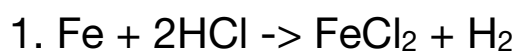
2. Group together 'like' species into two separate equations

3. Balance these two half equations

4. Identify reduction and oxidation equation, and thus oxidising and reducing agents.



Identify the oxidising and reducing agents in each equation



Uses of oxidising and reducing agents:

Redox titrations

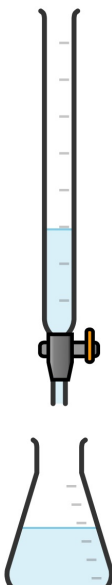
In a redox titration a reducing agent and oxidising agent react. The end point occurs when exactly the correct _____ are _____ from reducing agent to oxidising agent.

An indicator can be used to see the end point. When acidified potassium permanganate is used as oxidising agent, no indicator is required as it is _____ - _____.

The calculations carried out are the same for acid-base titrations.

An iron tablet was crushed and dissolved in deionised water in a 250 ml standard flask. 25 ml aliquots of this solution were titrated with 0.00025 mol/l potassium permanganate solution. The following titration data was gathered. Calculate the mass of iron in the original tablet.

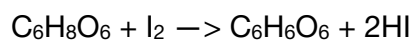
$\text{MnO}_4^- + 5\text{Fe}^{2+} + 8\text{H}^+ \rightarrow \text{Mn}^{2+} + 5\text{Fe}^{3+} + 4\text{H}_2\text{O}$



Titration	Start volume (ml)	End volume (ml)	Added volume (ml)
Rough	0	21.3	21.3
1	21.3	41.4	20.1
2	0	20.3	20.3



A vitamin C tablet is crushed and dissolved in deionised water in a 50 ml standard flask. 10 ml aliquots are then titrated with 0.0625 mol/l iodine solution using starch indicator. Calculate the mass of vitamin C in the tablet.



Titration	Start volume (ml)	End volume (ml)	Added volume (ml)
Rough	0	18.8	18.8
1	18.8	36.7	17.9
2	0	18.1	18.1